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AUTHOR	Golub, Lester S.
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ABSTRACT

Computer specialists developed a computer-assisted instructional (CAI) literacy development program for career oriented youths, the goals of which were: 1) to enable illiterate and semiliterate youths (ages 14-21) to read at the 8th grade level in the area of their vocational choice; 2) to offer them job-oriented reading materials to assist in preparing them for jobs; and 3) to give them a sequence of career information. The program took advantage of a CAI's ability to store, evaluate, and feedback information, to engage student interest, and to individualize instruction. It used an IBM 1500 computer with Coursewriter II language and had a student display screen, keyboard, light-pen, random-access audio and image projectors, and playback-record capacity. The program obtained biographical information from students and directed them through a series of instructional units, criterion checks, and tests. Formative and tentative summative evaluations of student interests and learning demonstrated the capability of the system to offer them a useful reading program. (PB)

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A CAI LITERACY DEVELOPMENT PROGRAM FOR CAREER-ORIENTED YOUTH

Lester S. Golub
The Pennsylvania State University

A literacy development program for career-oriented youths has been developed and is being validated at the Computer Assisted Instruction Laboratory at The Pennsylvania State University. Computer-assisted instruction possesses three fundamental characterstics which seem to suggest significant gains over other mechanical devices. First, the computer has the ability to pre-store a program, to evaluate a student's response, and to provide information regarding the correctness of the response. In a typical classroom of 30 students, only the very bright, aggressive students will be able to respond and to receive feedback from the teacher as many as five times each period. The poorer and more reticent students may receive feedback two or three times each week during the school year. Results to date show that students who receive instruction from computers respond from once every four seconds to once every thirty seconds, or 40 to 600 times during a 40-minute session at a computer terminal.

A second characteristic of CAI is active response of students. Only the best students in a class can respond actively and critically to a text-book. The slower students are generally not equipped for this kind of learning.

A third characteristic of computer-assisted instruction is the course author's ability to individualise instruction not only at the level of achievement but in reference to the specific interests and abilities of the student taking the course. The computer can keep a record of the student's performance and progress through a course and an author can alter that course based upon the individual student's progress with the materials.

The computer system used at the CAI Laboratory of Penn State University is the IBM 1500, designed specifically for instructional purposes. The computer language is Coursewriter II. The student station of the CAI system consists of a small television (cathode-ray) tube for the student display device, a typewriter keyboard, a light-pen for feeding

EM 011 256

responses to the program, a random-access audio, playback-record capacity, and a random-access image projector, all under program control.

THE CAI, CAREER-ORIENTED, LITERACY DEVELOPMENT SYSTEM

Illiteracy and semi-literacy haunt the American social scene. There are currently approximately twenty million adult illiterates in the United States; still more millions have a literacy level so limited that it makes normal reading and writing functions virtually impossible. A productive and literate citizenry is of first-order importance in a representative democracy.

GOALS

The objective of this Computer-Assisted Instructional Program is summarized as follows:

1. To provide reading instructions to illiterate and semi-literate adults so that they can read at an eighth grade reading level or higher in vocational areas of their choice.

2. To provide job oriented reading materials to assist the student in preparing for the job world such as:

   a. Reading and responding to want ads

   b. On the job health and appearance

   c. Obtaining certificates and licenses

3. To provide a sequence of career information for the student in the following career areas:

   a. Building construction
   b. City employee
   c. Clerical
   d. Communication
   e. Driver and transportation
   f. Garment industry
   g. Heavy construction
   h. Heavy and light industry
   i. Sales
   j. Hospital and medical
   k. Outdoors
   l. Restaurant and food services

ORGANIZATION AND MANAGEMENT OF THE PROGRAM

This program is divided into two phases as follows:

Phase I (Lite I): Initial Reading and Job World Orientation, Reading Level Grades 1-3

1. Initial sound to symbol, linguistic code-breaking instruction.
2. Pool of reading materials utilizing code-breaking skills developed in (1) above and incorporating short reading selections designed to prepare the reader for the world of work.

Phase II (Lite II): Career-oriented reading in various job areas

Level 1: Reading level grades 4, 5, 6

Material covered:

a. Job duties and requirements
b. Job training
c. Job advantages and disadvantages
d. Job benefits and opportunities

Level 2: Reading level grades 7, 8

Material covered:

a. Technical details
b. Managing a small business
c. Foreman and job trainer

Computerized entry and exit tests will accompany both Phase I and Phase II.

Each student can also elect to take a computerized Vocational Interest Inventory.

An outline of Lite I reading pool topics and Lite II job area topics follows:

Lite I Reading Pool

I. Getting a Job
   A. How to Apply
      1. Letters of Application
      2. Telephone Inquiries
      3. Personal Interview
   B. Where to Apply
      1. Personnel Office
      2. Whom to see in a Personnel Office

II. Benefits and Deductions
    A. Social Security
    B. Hospitalization
    C. Tax Deductions
III. Necessary Documents
    A. Birth Certificate
    B. Work Permit
    C. Health Certificate
    D. Social Security

Lite II Planned Job Areas

I. Hospital
    A. Nurse Aide
    B. Orderly
    C. Physiotherapist
II. Food Services
    A. Chef
    B. Waiter
    C. Waitress
    D. Food Supervisor
III. Light Industry
    A. Auto Mechanic
    B. Appliance Repairman
    C. Tool and Die Maker
    D. Sheetmetal Worker
IV. Clerical
    A. File Clerk
    B. Receptionist
    C. Secretary
    D. Clerk-typist

STUDENT FLOW THROUGH PROGRAM

Figure I illustrates student flow through the individualized career-oriented reading program. When the student sits down at the computer (1), he will be given instruction on how to use the CAI equipment at the student station (2), he will learn the alphabet and the location of alphabet keys (3), he will furnish the computer with bio-

graphical data (4). If student is reading above third grade level, he is sent into Lite I (5). In Lite I, student starts phonics instruction (6). If student is achieving criterion in phonics instruction (7), he goes on with program (8) and into the reading pool (10). If phonics criterion test is not attained, student is pushed out of program. The reason for not keeping student in program is to avoid frustration, since the methodology used in this program will not be appropriate for that student. Students who remain in the program, continue with phonics instruction (11) and then take criterion test (12). If they reach criterion, they go in to new phonics and reading pool material (10, 14, 15). If criterion is not reached, students can have a review of materials (11, 12). After a final criterion test (15) students, those who pass leave phonics and reading pool program (17) after posttest (18). At this point the student can elect to go on to Lite II (19) or to end his instructional program (20).

Students enter Lite II with a pretest (21). If student is reading a grade level 4-6, he enters the Lite II program at Level 1, job descriptions. At this level he can select his job area (22). Criterion test is given when student completes a job area in Level 1. Student is then given the option to terminate program (24). When the student who continues his program (27) reaches a 6-7 grade reading level (28), and has exhausted his job description choices, he will take a posttest (25) and end the program (26) or move into Level II, task descriptions. Here he will select a task description within job area (29). Criterion tests are given for each selection (30). After each selection, student has the option to terminate the program (31). When the student has attained grade level 8-9 (35) and has exhausted his task descriptions, student gets a posttest (32) and can elect to end the program (33) or to continue to Level III (34), technical description. In Level III, student selects a technical reading task (34). At the completion of each selection, he is given a criterion test (38). Student can leave the program by taking a posttest (39). He can elect (41) to end the program (40) or he can go on to a new technical reading selection (42).

Insert Figure 1 about here

FORMATIVE AND SUMMATIVE EVALUATION

The formative evaluation uses 5-10 students to provide feedback for modification of the newly developed CAI literacy program. The formative evaluation has provided information on the following questions:

1. Students' interest and motivation
   a. How long do students stay on line?
   b. How many times do students return to program?
   c. How many units does student complete in a gauged time period?
   d. What topics do students choose most often?
   e. Are two attempts per item sufficient?
2. Development Objectives
   a. Reading
      1). Are vocabulary, syntax, and readibility at prescribed reading level?
      2). Do selections give information that is new for student?
      3). Do reading selections meet reading and career objectives?
      4). Do reading selections have an organization pattern that helps students answer comprehension, vocabulary, and language skill items?
   b. Items
      1). Can student demonstrate 90% knowledge of vocabulary?
      2). Can student demonstrate 80% knowledge of comprehension?
      3). Can student demonstrate 70% knowledge of skill?
   c. Career Information
      1). Are vocabulary words taught mainly career specific?
      2). Are comprehension questions mainly career specific?
      3). Are language skill items mainly career specific?

After the formative evaluation was completed, the program was revised and the summative evaluation conducted.

The summative evaluation uses 30 students to provide information on student progress through the revised system in the following areas:

1. Student interest and motivation.
2. Student's progress in the system, Lite I:
   a. Student's reading level on pretest.
   b. Number of students passing phonics criterion test, number of students "out," number of students "in."

c. Length of time in phonics materials.

d. Length of time in reading pool materials.

e. Number of correct and wrong answers on items - first try, second try, no second try.

f. Number of students meeting criteria on items:

1). 90% vocabulary

2). 80% comprehension

3). 70% skill

g. Student's reading level on posttest.

3. Student's progress in system, Lite II:

a. Student's reading level on pretest.

b. Student's length of time to read selections.

Student's reading rate.

$$\frac{\text{Time to read selection}}{\text{Number of words}} = \text{reading rate.}$$

c. Length of time to work on items of a selection.
Vocabulary + Comprehension + skill = total time

d. Number of items correct - first time, second time, not second time.

e. Do students meet criterion level:

1). 90% vocabulary

2). 80% comprehension

3). 70% skill

f. Student's exit reading level in posttest.

g. Number of job areas selected.

h. Number of repeats.

The end products of this program has produced: (1) a fully documented demonstration CAI Literacy Development for career-oriented youth (ages 14-21); (2) a formative and summative evaluation of the program; and (3) a report on the cost effectiveness and implementation of the program.

1. Enter
2. Student Introduction to CAI
3. Instruction in Using the Keyboard
4. Collect Biographical Data on Each Student
5. Diagnostic Test: Is Student Above Grade 3 Reading Level?
6. Begin Phonics Instruction
7. Criterion Check: Phonics
8. Passed Criterion?
9. Student Pushed Out of Program
10. Reading Pool Available?
11. Continue Phonics Instruction
12. Criterion Test: Phonics
13. Passed Criterion?
14. Practice Reading Selections From the Reading Pool
15. Criterion Check: Reading Pool
16. Criterion Passed?
17. Option: Finished with Phonics?
18. Posttest
19. Continue to Lite II?
20. End
21. Pretest: Is Student's Reading Level 5-6 Grade?
22. Select Job Area, Level I
23. Criterion Test: Job Area, Level I
24. Option: Does Student Want to Terminate Program?
25. Posttest
26. End
27. Choose New Level I Job Area?
28. Reading at Grade Levels 7-8
29. Select Job Area, Level II
30. Criterion Test: Job Area, Level II
31. Option: Does Student Want to Terminate Program?
32. Posttest
33. End
34. Choose New Level II Job Area?
35. Reading at Grade Levels 9-10+?
36. Select Job Area, Level III
37. Criterion Test, Level III
38. Passed Criterion?
39. Posttest
40. End
41. Want to Terminate Program?
42. Select New Level III Job Area?

Figure 1

Student Flow Chart Through CAI Career-Oriented Literacy Program

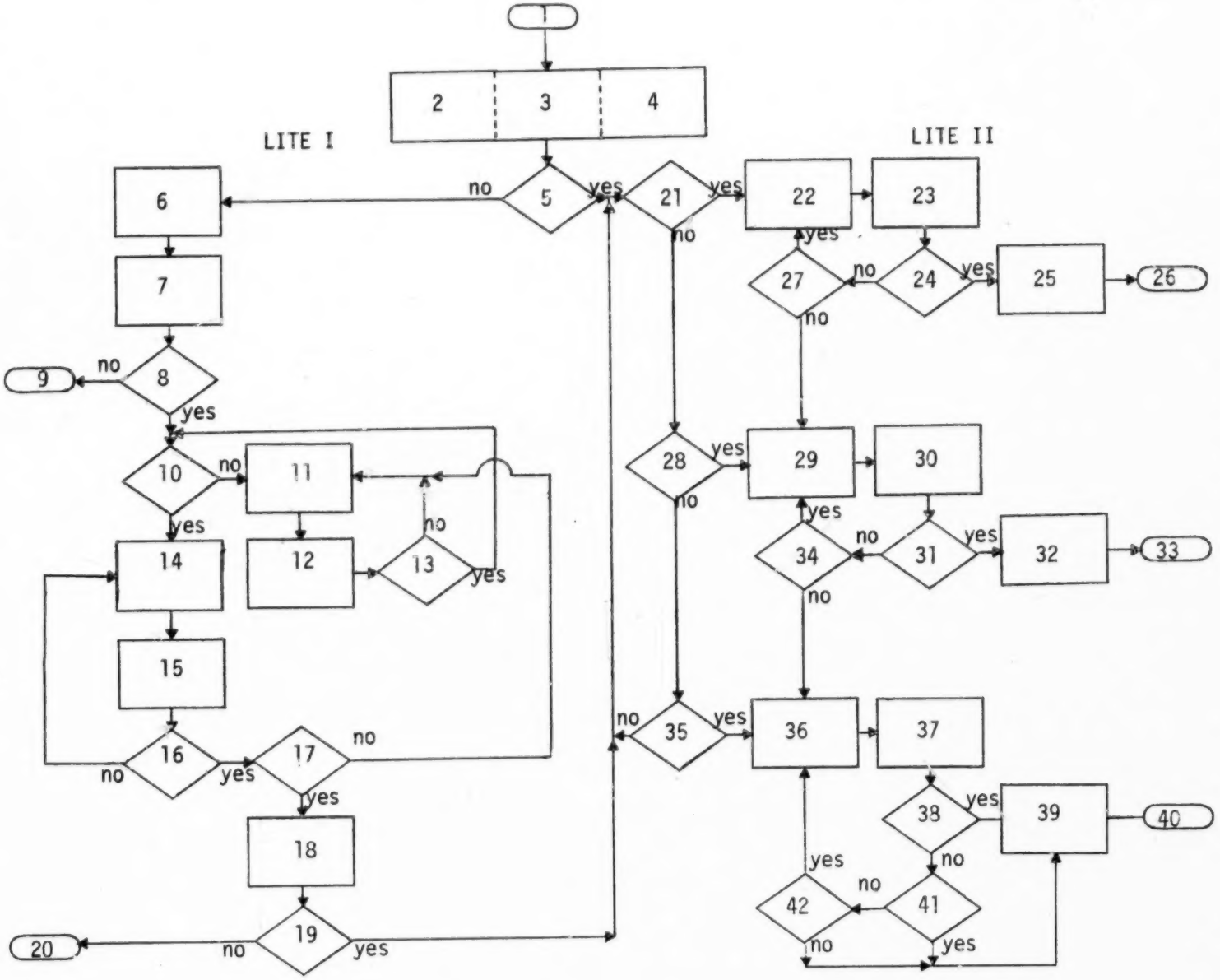

Fig. 1. Studert flowchart through CAI career-oriented literacy program.

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